

INTERNATIONAL SEARCH REPORT

Intern. Application No.
PCT/ZA 00/00057

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 D21J7/00 D21J5/00 D21J3/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 D21J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 728 868 A (SINTOKOGIO LTD) 28 August 1996 (1996-08-28) abstract column 4, line 21 - line 45 column 5, line 28 - line 33 figures	14, 16, 17, 19
A	---	1-13, 15, 18
X	US 4 088 259 A (SUTTON JOHN T) 9 May 1978 (1978-05-09) column 5, line 40 - column 7, line 20; figure 7	1, 10, 14, 18, 19
X	EP 0 731 214 A (REXAM CORRUGATED SOUTH WEST LI) 11 September 1996 (1996-09-11) claims	19
A	---	1-18
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

*** Special categories of cited documents :**

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

30 May 2000

Date of mailing of the international search report

07/06/2000

Name and mailing address of the ISA

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 229 550 A (BROADWAY HOLDINGS PTE. LTD) 29 May 1996 (1996-05-29) abstract	16, 19
A	—	1-15, 17, 18
X	EP 0 055 949 A (CII HONEYWELL BULL) 14 July 1982 (1982-07-14) figures 1, 6-9	19
A	—	1-18
X	US 5 833 805 A (EMERY ROY WILLIAM) 10 November 1998 (1998-11-10) column 2, line 3 - line 63	19
A	—	1-18
X	WO 92 11414 A (CHAMBERLAIN CHRISTOPHER JOHN) 9 July 1992 (1992-07-09) page 3, line 29 -page 4, line 29 figure 1	19
A	—	15
A	US 5 174 863 A (EMERY ROY W) 29 December 1992 (1992-12-29) column 7, line 50 -column 8, line 39; figure 1	
A	—	
A	US 5 656 135 A (BAKER ROGER J) 12 August 1997 (1997-08-12)	
A	—	
A	US 5 531 864 A (MIYAMOTO YASUHIRO ET AL) 2 July 1996 (1996-07-02)	

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter-Application No

PCT/ZA 00/00057

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0728868	A	28-08-1996	JP 8232199 A JP 8260400 A CA 2170181 A	10-09-1996 08-10-1996 25-08-1996
US 4088259	A	09-05-1978	AU 520796 B AU 3869078 A BR 7805737 A CA 1075208 A DE 2847907 A DK 495078 A,B, FR 2407873 A GB 2007583 A,B JP 1384577 C JP 54088478 A JP 61039236 B MX 145995 A NO 782972 A,B, ZA 7804365 A	25-02-1982 14-02-1980 29-05-1979 08-04-1980 10-05-1979 09-05-1979 01-06-1979 23-05-1979 26-06-1987 13-07-1979 02-09-1986 28-04-1982 09-05-1979 25-07-1979
EP 0731214	A	11-09-1996	NONE	
GB 229550	A		NONE	
EP 0055949	A	14-07-1982	FR 2496986 A DE 3172632 D JP 57130110 A US 4425076 A	25-06-1982 14-11-1985 12-08-1982 10-01-1984
US 5833805	A	10-11-1998	CA 2140184 A CA 2165902 A	21-11-1995 10-07-1996
WO 9211414	A	09-07-1992	NZ 236527 A AU 9107091 A ZA 9109925 A	27-06-1994 22-07-1992 30-09-1992
US 5174863	A	29-12-1992	CA 2021492 A	19-01-1992
US 5656135	A	12-08-1997	CA 2156285 A EP 0687327 A JP 8507833 T WO 9419540 A US 6048440 A	01-09-1994 20-12-1995 20-08-1996 01-09-1994 11-04-2000
US 5531864	A	02-07-1996	JP 2836801 B JP 6128900 A CA 2090994 A,C DE 69306440 D DE 69306440 T EP 0559490 A EP 0559491 A JP 2836800 B JP 6128899 A KR 9615817 B US 5431784 A US 5399243 A US 5547544 A	14-12-1998 10-05-1994 07-09-1993 23-01-1997 15-05-1997 08-09-1993 08-09-1993 14-12-1998 10-05-1994 21-11-1996 11-07-1995 21-03-1995 20-08-1996

PATENT COOPERATION TREATY

PCT

REC'D 10 JUL 2001

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70) 9/937808

Applicant's or agent's file reference PCT/2000/036		FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/ZA00/00057	International filing date (day/month/year) 24/03/2000	Priority date (day/month/year) 26/03/1999	
International Patent Classification (IPC) or national classification and IPC D21J7/00			
Applicant SOUTHERN PULP MACHINERY (PTY) LIMITED et al.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 12 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 23/10/2000	Date of completion of this report 06.07.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Naeslund, P Telephone No. +49 89 2399 8614



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/ZA00/00057

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1,3-10,14	as originally filed			
2,2A,11,12,12A, 13	as received on	21/05/2001	with letter of	18/05/2001

Claims, No.:

6-9	as originally filed			
1-5,10-14	as received on	21/05/2001	with letter of	18/05/2001

Drawings, sheets:

1/7,2/7,4/7-7/7	as originally filed			
3/7	as received on	21/05/2001	with letter of	18/05/2001

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/ZA00/00057

- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	3,5-9,11-14
	No:	Claims	1,2,4,10
Inventive step (IS)	Yes:	Claims	NONE
	No:	Claims	1-14
Industrial applicability (IA)	Yes:	Claims	1-14
	No:	Claims	NONE

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. From EP-A-0 728 868 (D1) (see col. 4, line 21-line 45; col. 5, line 28-line 33; figures) there is known a pulp moulding process for drying a wet preformed pulp including all essential features of at least claims 1,2,4 and 10 (Art. 33(2) PCT). The preformed pulp molding M is sucked (thus implicit a forming die present) by the receiving mold 1 (first die element) and is simultaneously pressed by the drying mold 10 (second die element - note hot air inlet 19). That the pressed, dried pulp products are transferred by the receiving mold downstream is considered as inherent in this type of processes. And also when this latter feature would be considered novel it is in any case not inventive as it is known from figures 1-3 of the present application which according to the applicant describe prior art in the field (Article 33 (3) PCT).

From US-A-4 088 259 (D2) (see col. 5, line 40-col. 7, line 20; figure 7) there is known an arrangement including the features: preparing pulp stock; a moulding in a die or mould (54); transferring in first die element (56) of a heated transferring die-and-heated pressing tool arrangement (56;58); transferring to the down line facility. This disclosure would therefore appear to anticipate at least claim 10 (Article 33(2) PCT). That in claim 1 the transfer to the down-line facility is performed by the second die element is only a matter of normal design procedure and therefore in any case not inventive (Art. 33(3) PCT).

Note I: claim 10 could be interpreted (see item VII-1 below) as if all features between "for use in" until "down-line facility" are not mandatory included in the scope of the claim. If such a view is taken then claim 10 does not amount to more than a tool arrangement of the type as clearly described in e.g. D1, Fig. 1 (see in particular ref. signs 10, 3, 19 and 7).

Note II: neither claim 1 nor claim 10 are restricted to a use in total of only three dies. Expressions such as "including" and "comprising" employed in claims 1 and 10 are not exclusive but inclusive.

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EXAMINATION REPORT - SEPARATE SHEET**

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2. With regard to the rest of the dependent claims, in the view of the cited prior art inclusively EP-A-0 731 214 (D3), EP-A-0 055 949 (D4), US-A-5 833 805 (D5) and WO-A-92 11414 (D6)(see international search report) they would not appear to be able to add any novel and inventive features to the independent claims on which they depend (Art. 33(3) PCT).
3. The industrial application would appear to be evident (Art. 33(4) PCT).

Re Item VII

Certain defects in the international application

1. Reference signs from the figures should be carefully included in the apparatus claims.
2. A document, or documents, reflecting the prior art ("in-mould drying" or "thermo-formed process") described on page 2, first paragraph is not identified in the description. It is requested that the applicants file the corresponding document(s) (Rule 5.1(a)(ii) PCT) on entry into the national/regional phase.
3. The two-part form should be (correctly) applied to each independent claim. It is not understood on which prior art the present preambles have been based as the features *"a first die element of a heated transferring die-and-heated pressing tool arrangement, comprising a first die element and a second die element, having a mould cavity therebetween,"* which features would appear essential are alternatively present either in the preamble (cf. claim 10) or the characterizing part (cf. claim 1). The format followed is usually: "A (name of the DEVICE and its FUNCTION) of the type having (recitation of the PRIOR ART, usually that found in a single REFERENCE) characterized in that (recitation of the improvement in the claim BODY)."
4. The documents D4-D6 cited should be acknowledged in the description. It should be clear which features of each of the independent claims are novel in view of each of the cited prior art.

Re Item VIII

Certain observations on the international application

1. It is not clear to which Category of claim, claim 10 pertains. The term "arrangement" normally implies an apparatus claim. Claim 10 however is to an essential part drafted in terms of process features (Art. 6 PCT). Whilst it is understood that it in certain cases could be necessary to recite process features in apparatus claims this would however not appear to be the present case. Claim 10 could be interpreted in such a way that all features included in "for use...down-line facility") are not a part of the tool arrangement, only an indication where it can be put into practice. It is thus not clear which apparatus features are mandatory included in the claim.
2. On page 12, second paragraph the heated transfer die (13)-and-heated pressing tool arrangement (14) is set out as being rotatable ("is rotatable") (emphasis added). This feature which would appear an essential feature is not present in the independent claims 1 and 10. It follows that it is questionable whether these claims describe the invention such that the problem underlying the present application is solved.
3. In view of what has been set out under point 2 it should be clear that the definition of the tool arrangement in claim 11 to be "A heated transfer die-and pressing tool arrangement" necessarily renders this claim unclear (Article 6 PCT).
4. The fact that the essential features *"a first die element of a heated transferring die-and-heated pressing tool arrangement, comprising a first die element and a second die element, having a mould cavity there between,"* figures in either the preamble or in the characterizing portion of the independent claims 10 and 1 renders these claims unclear (Article 6 PCT).
5. Claim 14 is directed to a "Press drying equipment as claimed in claim 10". Claim 10 however, on which claim 14 is dependent does not recite any "press drying equipment". In other words there is a lack of antecedent for the term "press drying equipment) (Article 6 PCT).

A known improvement of the traditional pulp moulding process is the so-called "in-mould drying" or "thermo-formed" process, the process endeavouring to achieve an improved quality comparable with injection moulded, thermoformed plastic products.

- 5 The in-mould drying process comprises the traditional process, characterized in that it substitutes the step of conveyor drying with an in-mould drying step wherein the wet or so-called "in-mould" dried product is press dried between heated, opposed, closable pressing tools, with steam resulting from the heating being scavenged under vacuum. The incorporation of the in-mould drying step is aimed at improving poor product finish such
- 10 as surface coarseness as well as dimensional inaccuracies and deformities. The poor product finish is caused primarily during the drying process, where the wet product is subjected to high temperature, high velocity air flow. In a preferred form, the in-mould drying process includes further in-mould drying in down line pressing stations. The added advantage of additional pressing stations is the speeding up of the pressing portion of the
- 15 pressing and drying process.

A variation of such in-mould drying processes is found in U S Patent no. 4,088,259 in the name of John T Sutton. U S Patent No. 4,088,259 discloses apparatus for moulding an egg carton wherein a pulp egg carton is formed in a forming mould, transferred to a

20 vacuum drying mould, and carried through several subsequent drying and finish-forming stations.

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Known disadvantages of the in-mould drying process however include relatively slower
5 cycle times and corresponding lower product output, relatively high down time due to
slower mould changing procedures, expensive tooling, an additionally required vacuum
system for steam scavenging and relatively larger sized moulders so as to provide for the
additional pressing stations and expensive pneumatic and/or hydraulic pressing system.

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pressing tools (9) with means for scavenging steam resulting from heating under vacuum from the wet product. Once the product has been dried to the required degree, the dried product is ejected onto a conveyor (11) for transfer to down line facilities.

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The process typically includes a facility (12) for cooling the steam scavenged under vacuum from the wet products (9).

10 An in-mould drying, pulp moulding process in accordance with the invention and partially as illustrated in figure 3 includes the steps of preparing pulp stock in a pulper (not shown); forming wet products by means of forming dies (7) in a moulder (6); transferring the wet products from the forming dies by means of a heated transferring die-and-heated pressing tool arrangement generally indicated by the number 35, comprising a first die element (13) and a second die element (14), having a mould cavity therebetween, for in-mould
15 pressing and drying of the wet products; and delivering the dried products to a conveyor belt (11) for conveyance to a storage facility (18) where the dried products are stacked by means of an automatic stacker (15).

20 As in the traditional type moulding process (figure 1) and the existing in-mould drying, pulp moulding process (figure 2), the in-mould drying, pulp moulding process in accordance with the invention utilizes negative and positive air pressures to retain the

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products in the respective dies (7), (13) and (14) and to eject the products from the dies and/or pressing moulds (14) when required.

- 5 The in-mould drying equipment in the form of the first die element (13) and the second die element (14) of the heated transfer die-and-heated pressing tool arrangement is rotatable so as to enable the transfer and press drying of the wet products from the forming die (7) to the conveyor (11) as dry products.
- 10 The first die element (13) and the second die element (14) are operatively associated mechanically with each other so as to provide a heated mechanical press therebetween, thus defining the heated transfer die-and-heated pressing tool arrangement therewith.
- Existing in-mould drying equipment as illustrated in figure 4 comprises a mould, having a male part (7) and a complementary female part (8), each part being heated electrically by
- 15 means of electric elements (19) so as to ensure the drying of an in-mould wet product (18). Male and female parts (7) and (8) are provided with air passages for scavenging steam generated during the drying process from the wet product (18) under vacuum.

12/A

Further in-mould drying equipment is disclosed in European Patent Application No. EPO 728 868 A2 in the name of Sintokogio Ltd. Comprising a pair of dies, each die being made
5 up of a moulding member and a chamber forming member, forming between them a chamber, into which hot air is supplied. The moulding member includes a plurality of air-vent through-bores transmitting the hot air to the in-mould wet product.

In-mould drying equipment in accordance with the invention and as illustrated in figure 5
10 comprises a male part (20) and a female part (21), each part being provided with a fluid passage (22) for receiving a heated fluid therethrough for the drying of the in-mould wet product (18).

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The male part (20) is further provided with a set of vents (23) so as to allow steam generated during the in-mould drying step to escape from the wet product (18) therethrough to the atmosphere. Alternatively, the steam generated may be scavenged
5 under vacuum.

Alternatively designed in-mould drying equipment in accordance with the invention and as illustrated in figure 6 comprises a male part (24) and a female part (25), corresponding with the elements (13) and (14) respectively, each part being provided with a primary fluid
10 passage (22) for receiving heating fluid therethrough so as to dry the in-mould wet product (18) therebetween.

In a second, and preferred, alternative design for in-mould drying equipment, as illustrated in figure 7, both the male part (24) and the female part (25) comprise a die element (28) and (29) respectively, mounted to a plate (30) including a plenum chamber (31)
15 incorporating the primary fluid passage. The heated transfer die-and-pressing tool arrangement is configured so as to allow the in-mould pressing and drying step to take place with the plate (30) being orientated substantially vertically.

20 The male part (24) is further provided with a set of secondary fluid passages (27) and the female part (25) is further provided with a set of vents (26), the set of secondary fluid passages and the set of vents being staggered relative to each other so as to communicate

CLAIMS

1. A pulp moulding process including the steps of preparing pulp stock; forming pulp products by means of a forming die; and delivering the pulp products to a down-line facility, the process being characterized in that wet pulp products are transferred from the forming die by means of a first die element of a heated transferring die-and-heated pressing tool arrangement, comprising a first die element and a second die element, having a mould cavity therebetween, simultaneously pressed and dried in the heated transferring die-and-heated pressing tool arrangement, and transferred to the down-line facility by the second die element as pressed, dried pulp products.
2. A pulp moulding process according to claim 1, including the step of using a heated fluid medium for providing heat in the pressing and drying step.
3. A pulp moulding process according to claim 2, wherein the heated fluid medium is steam.
4. A pulp moulding process according to claim 2, wherein the heated fluid medium is thermal oil.

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5. A pulp moulding process according to claim 4, wherein the thermal oil is maintained at a negative gauge pressure.

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10. A tool arrangement for use in a pulp moulding process including the steps of preparing pulp stock, forming wet products by means of a forming die, transferring the wet products from the forming die by means of a first die element
5 of a heated transferring die-and heated pressing tool arrangement comprising a first die element and a second die element, having a mould cavity therebetween, simultaneously pressed and dried in the heated transferring die-and-heated pressing tool arrangement, and transferred to the down-line facility; the tool arrangement being characterised in having a male part and a female part, at least
10 one part being provided with a primary fluid passage for receiving a heating fluid therethrough and at least one part being provided with at least one vent so as to allow steam generated during an in-mould pressing and drying step to escape therethrough.
- 15 11. A heated transfer die-and-pressing tool arrangement as claimed in claim 10, characterized in that at least one of the male part and female part comprises a die element mounted on a plate, having a plenum chamber incorporating the primary fluid passage.
- 20 12. A heated transfer die-and-pressing tool arrangement as claimed in 10 or 11, characterized in being provided with at least one secondary fluid passage for

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receiving pressurized gas, such as air, therethrough, the secondary fluid passage
being orientated so as to communicate gaseously with the vent to force the

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pressurized gas and the steam generated during the in-mould drying step in one direction through the in-mould wet product.

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13. A heated transfer die-and-pressing tool arrangement as claimed in any of claims 10 - 12, characterized by being provided with a set of secondary fluid passages and a set of vents, the set of secondary fluid passages and the set of vents being staggered relative to each other so as to enhance the substantially uniform flow of pressurized gas through the wet product.

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14. Press drying equipment as claimed in claim 10, characterized by the heated transfer die-and-heated pressing tool arrangement being rotary so as to enable rotary transfer and drying of a wet product between a forming die and a down line facility.

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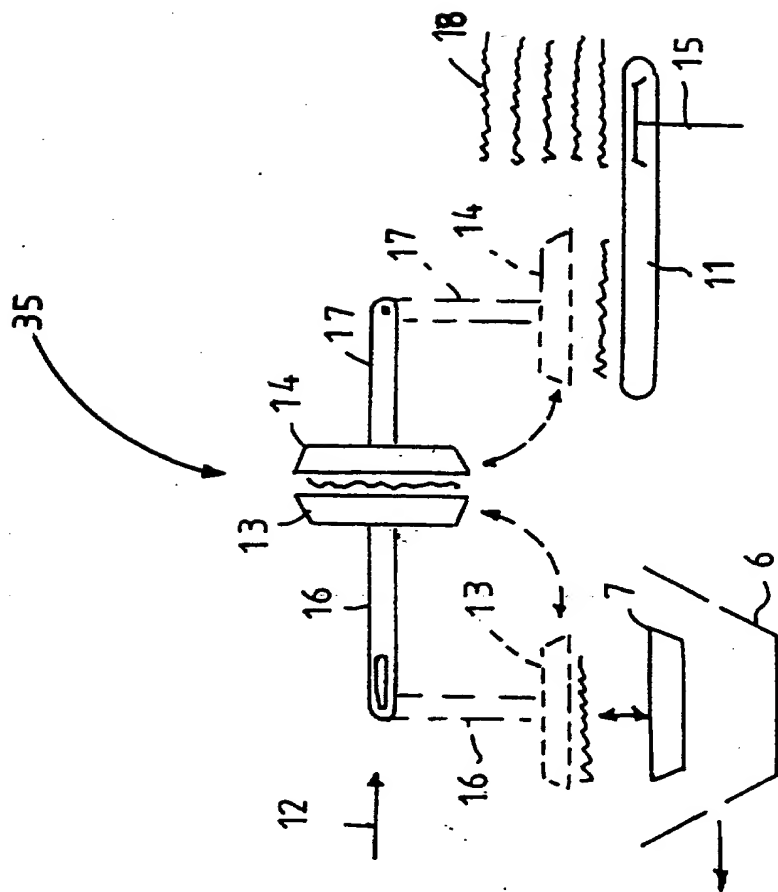


FIGURE 3

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CLAIMS

1. A pulp moulding process including the steps of preparing pulp stock; forming pulp products by means of a forming die; and delivering the pulp products to a down-line facility, the process being characterized in that wet pulp products are transferred from the forming die by means of a heated transferring die-and-heated pressing tool arrangement for in-mould pressing and drying of the wet pulp products such that pressed, dried pulp products are delivered to the down-line facility.
2. A pulp moulding process according to claim 1, including the step of using a heated fluid medium for providing heat in the pressing and drying step.
3. A pulp moulding process according to claim 2, wherein the heated fluid medium is steam.
4. A pulp moulding process according to claim 2, wherein the heated fluid medium is thermal oil.
5. A pulp moulding process according to claim 4, wherein the thermal oil is maintained at a negative gauge pressure.

10. A transfer die-and-heated pressing tool arrangement for use in a pulp moulding process including the steps of preparing pulp stock, forming wet products by means of a forming die, transferring the wet products from the forming die by means of a heated transferring die-and-heated pressing tool arrangement for in-mould pressing and drying of the wet product, and delivering the dried products to a down line facility; the transfer die-and-heated pressing tool arrangement being characterised in having a male part and a female part, at least one part being provided with a primary fluid passage for receiving a heating fluid therethrough and at least one part being provided with at least one vent so as to allow steam generated during an in-mould pressing and drying step to escape therethrough.

11. A heated transfer die-and-pressing tool arrangement as claimed in claim 10, characterized in that at least one of the male part and female part comprises a die element mounted on a plate, having a plenum chamber incorporating the primary fluid passage.

12. A heated transfer die-and-pressing tool arrangement as claimed in 10 or 11, characterized in being provided with at least one secondary fluid passage for receiving pressurized gas, such as air, therethrough, the secondary fluid passage being orientated so as to communicate gaseously with the vent to force the

pressurized gas and the steam generated during the in-mould drying step in one direction through the in-mould wet product.

13. A heated transfer die-and-pressing tool arrangement as claimed in any of claims 10
5 - 12, characterized by being provided with a set of secondary fluid passages and a set of vents, the set of secondary fluid passages and the set of vents being staggered relative to each other so as to enhance the substantially uniform flow of pressurized gas through the wet product.
- 10 14. Press drying equipment for an in-mould drying, pulp moulding system, the press drying equipment being characterized by including a heated transfer die and a heated pressing tool, the heated transfer die and the heated pressing tool being operatively associated mechanically with each other so as to provide a heated,
15 mechanical press therebetween in a heated transfer die-and-heated pressing tool arrangement.
15. Press drying equipment as claimed in claim 14, characterized by the heated transfer die-and-heated pressing tool arrangement being rotary so as to enable rotary transfer and drying of a wet product between a forming die and a down line
20 facility.

16. A method for in-mould drying of a wet product in a pulp moulding process, the method characterized by including the step of passing pre-heated gas, such as air, through an in-mould wet product so as to accelerate the drying of the product.
- 5 17. A method of heating a pressing tool in a pulp moulding process, the method characterized by including the step of flowing a heating fluid through a fluid passage in a heated pressing tool.
- 10 18. An in-mould drying, pulp moulding system comprising means for preparing pulp stock; a wet forming section, incorporating forming dies; and means for transferring wet product from the forming dies and press drying the wet product, the means including a heated transferring die-and-pressing tool arrangement.
- 15 19. A pulp moulded product, characterised in being manufactured using a pulp moulding process including the steps of preparing pulp stock; forming wet products by means of a forming die; transferring the wet products from the forming die by means of a heated transferring die-and-heated pressing tool arrangement for in-mould pressing and drying of the wet product; and delivering the dried products to a down line facility.
- add a*

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:
D.M. KISCH Inc.
Attn. LE ROUX, Marius
P.O. Box 781218
SANDTON 2146
SOUTH AFRICA

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT
OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference PCT/2000/036	Date of mailing (day/month/year) 07/06/2000
International application No. PCT/ZA 00/00057	International filing date (day/month/year) 24/03/2000
Applicant SOUTHERN PULP MACHINERY (PTY) LIMITED et al.	

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:
The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority European Patent Office, P.B. 5818 Patentaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Véronique Baillou
---	--

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference PCT/2000/036	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/ZA 00/00057	International filing date (day/month/year) 24/03/2000	(Earliest) Priority Date (day/month/year) 26/03/1999
Applicant SOUTHERN PULP MACHINERY (PTY) LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of Invention is lacking (see Box II).

4. With regard to the title,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the abstract,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

3



None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ZA 00/00057

Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

A pulp moulding process including the steps of preparing pulp stock, forming wet products by means of a forming die (7), transferring the wet products from the forming die by means of a heated transferring die(13)-and-heated pressing roll (14) arrangement for in-mould pressing and drying of the wet product, and delivering the dried products to a down line facility (18). The invention extends to a pulp moulding system, specific pulp moulding apparatus and a pulp moulded product made by such a process, system and/or apparatus.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/ZA 00/00057

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 D21J7/00 D21J3/00 D21J3/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 D21J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 728 868 A (SINTOKOGIO LTD) 28 August 1996 (1996-08-28) abstract column 4, line 21 - line 45 column 5, line 28 - line 33 figures	14, 16, 17, 19
A	-----	1-13, 15, 18
X	US 4 088 259 A (SUTTON JOHN T) 9 May 1978 (1978-05-09) column 5, line 40 - column 7, line 20; figure 7	1, 10, 14, 18, 19
X	EP 0 731 214 A (REXAM CORRUGATED SOUTH WEST LI) 11 September 1996 (1996-09-11) claims	19
A	-----	1-18
	-----	1-18

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the international search

30 May 2000

Date of mailing of the international search report

07/06/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Naeslund, P

INTERNATIONAL SEARCH REPORT

International Application No

PCT/ZA 00/00057

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 229 550 A (BROADWAY HOLDINGS PTE. LTD) 29 May 1996 (1996-05-29) abstract	16, 19
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X	EP 0 055 949 A (CII HONEYWELL BULL) 14 July 1982 (1982-07-14) figures 1, 6-9	19
A	----	1-18
X	US 5 833 805 A (EMERY ROY WILLIAM) 10 November 1998 (1998-11-10) column 2, line 3 - line 63	19
A	----	1-18
X	WO 92 11414 A (CHAMBERLAIN CHRISTOPHER JOHN) 9 July 1992 (1992-07-09) page 3, line 29 -page 4, line 29 figure 1	19
A	----	15
A	US 5 174 863 A (EMERY ROY W) 29 December 1992 (1992-12-29) column 7, line 50 -column 8, line 39; figure 1	
A	----	
A	US 5 656 135 A (BAKER ROGER J) 12 August 1997 (1997-08-12)	
A	----	
A	US 5 531 864 A (MIYAMOTO YASUHIRO ET AL) 2 July 1996 (1996-07-02)	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/ZA 00/00057

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0728868	A	28-08-1996	JP 8232199 A JP 8260400 A CA 2170181 A	10-09-1996 08-10-1996 25-08-1996
US 4088259	A	09-05-1978	AU 520796 B AU 3869078 A BR 7805737 A CA 1075208 A DE 2847907 A DK 495078 A,B, FR 2407873 A GB 2007583 A,B JP 1384577 C JP 54088478 A JP 61039236 B MX 145995 A NO 782972 A,B, ZA 7804365 A	25-02-1982 14-02-1980 29-05-1979 08-04-1980 10-05-1979 09-05-1979 01-06-1979 23-05-1979 26-06-1987 13-07-1979 02-09-1986 28-04-1982 09-05-1979 25-07-1979
EP 0731214	A	11-09-1996	NONE	
GB 229550	A		NONE	
EP 0055949	A	14-07-1982	FR 2496986 A DE 3172632 D JP 57130110 A US 4425076 A	25-06-1982 14-11-1985 12-08-1982 10-01-1984
US 5833805	A	10-11-1998	CA 2140184 A CA 2165902 A	21-11-1995 10-07-1996
WO 9211414	A	09-07-1992	NZ 236527 A AU 9107091 A ZA 9109925 A	27-06-1994 22-07-1992 30-09-1992
US 5174863	A	29-12-1992	CA 2021492 A	19-01-1992
US 5656135	A	12-08-1997	CA 2156285 A EP 0687327 A JP 8507833 T WO 9419540 A US 6048440 A	01-09-1994 20-12-1995 20-08-1996 01-09-1994 11-04-2000
US 5531864	A	02-07-1996	JP 2836801 B JP 6128900 A CA 2090994 A,C DE 69306440 D DE 69306440 T EP 0559490 A EP 0559491 A JP 2836800 B JP 6128899 A KR 9615817 B US 5431784 A US 5399243 A US 5547544 A	14-12-1998 10-05-1994 07-09-1993 23-01-1997 15-05-1997 08-09-1993 08-09-1993 14-12-1998 10-05-1994 21-11-1996 11-07-1995 21-03-1995 20-08-1996

PCT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference PCT/2000/036	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/ZA 00/ 00057	International filing date (day/month/year) 24/03/2000	(Earliest) Priority Date (day/month/year) 26/03/1999
Applicant SOUTHERN PULP MACHINERY (PTY) LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

3

☐ None of the figures.

Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

A pulp moulding process including the steps of preparing pulp stock, forming wet products by means of a forming die (7), transferring the wet products from the forming die by means of a heated transferring die(13)-and-heated pressing roll (14) arrangement for in-mould pressing and drying of the wet product, and delivering the dried products to a down line facility (18). The invention extends to a pulp moulding system, specific pulp moulding apparatus and a pulp moulded product made by such a process, system and/or apparatus.

INTERNATIONAL SEARCH REPORT

International Application No

P0007A 00/00057

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 D21J7/00 D21J5/00 D21J3/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 D21J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 728 868 A (SINTOKOGIO LTD) 28 August 1996 (1996-08-28) abstract column 4, line 21 - line 45 column 5, line 28 - line 33 figures	14,16, 17,19
A	---	1-13,15, 18
X	US 4 088 259 A (SUTTON JOHN T) 9 May 1978 (1978-05-09) column 5, line 40 - column 7, line 20; figure 7	1,10,14, 18,19
X	---	19
A	EP 0 731 214 A (REXAM CORRUGATED SOUTH WEST LI) 11 September 1996 (1996-09-11) claims	1-18

	---/---	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

30 May 2000

Date of mailing of the international search report

07/06/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Naeslund, P

INTERNATIONAL SEARCH REPORT

International Application No

PCT/ZA 00/00057

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 229 550 A (BROADWAY HOLDINGS PTE. LTD) 29 May 1996 (1996-05-29) abstract	16, 19
A	-----	1-15, 17, 18
X	EP 0 055 949 A (CII HONEYWELL BULL) 14 July 1982 (1982-07-14) figures 1, 6-9	19
A	-----	1-18
X	US 5 833 805 A (EMERY ROY WILLIAM) 10 November 1998 (1998-11-10) column 2, line 3 - line 63	19
A	-----	1-18
X	WO 92 11414 A (CHAMBERLAIN CHRISTOPHER JOHN) 9 July 1992 (1992-07-09) page 3, line 29 -page 4, line 29 figure 1	19
A	-----	15
A	US 5 174 863 A (EMERY ROY W) 29 December 1992 (1992-12-29) column 7, line 50 -column 8, line 39; figure 1	
A	-----	
A	US 5 656 135 A (BAKER ROGER J) 12 August 1997 (1997-08-12)	
A	-----	
A	US 5 531 864 A (MIYAMOTO YASUHIRO ET AL) 2 July 1996 (1996-07-02)	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PA 00/00057

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 0728868	A	28-08-1996	JP 8232199	A	10-09-1996
			JP 8260400	A	08-10-1996
			CA 2170181	A	25-08-1996
US 4088259	A	09-05-1978	AU 520796	B	25-02-1982
			AU 3869078	A	14-02-1980
			BR 7805737	A	29-05-1979
			CA 1075208	A	08-04-1980
			DE 2847907	A	10-05-1979
			DK 495078	A, B,	09-05-1979
			FR 2407873	A	01-06-1979
			GB 2007583	A, B	23-05-1979
			JP 1384577	C	26-06-1987
			JP 54088478	A	13-07-1979
			JP 61039236	B	02-09-1986
			MX 145995	A	28-04-1982
			NO 782972	A, B,	09-05-1979
			ZA 7804365	A	25-07-1979
EP 0731214	A	11-09-1996	NONE		
GB 229550	A		NONE		
EP 0055949	A	14-07-1982	FR 2496986	A	25-06-1982
			DE 3172632	D	14-11-1985
			JP 57130110	A	12-08-1982
			US 4425076	A	10-01-1984
US 5833805	A	10-11-1998	CA 2140184	A	21-11-1995
			CA 2165902	A	10-07-1996
WO 9211414	A	09-07-1992	NZ 236527	A	27-06-1994
			AU 9107091	A	22-07-1992
			ZA 9109925	A	30-09-1992
US 5174863	A	29-12-1992	CA 2021492	A	19-01-1992
US 5656135	A	12-08-1997	CA 2156285	A	01-09-1994
			EP 0687327	A	20-12-1995
			JP 8507833	T	20-08-1996
			WO 9419540	A	01-09-1994
			US 6048440	A	11-04-2000
US 5531864	A	02-07-1996	JP 2836801	B	14-12-1998
			JP 6128900	A	10-05-1994
			CA 2090994	A, C	07-09-1993
			DE 69306440	D	23-01-1997
			DE 69306440	T	15-05-1997
			EP 0559490	A	08-09-1993
			EP 0559491	A	08-09-1993
			JP 2836800	B	14-12-1998
			JP 6128899	A	10-05-1994
			KR 9615817	B	21-11-1996
			US 5431784	A	11-07-1995
			US 5399243	A	21-03-1995
			US 5547544	A	20-08-1996

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

To:

LE ROUX, Marius
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Applicant's or agent's file reference
PCT/2000/036

IMPORTANT NOTIFICATION

International application No.
PCT/ZA00/00057

International filing date (day/month/year)
24/03/2000

Priority date (day/month/year)
26/03/1999

Applicant
SOUTHERN PULP MACHINERY (PTY) LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT/2000/036		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/ZA00/00057	International filing date (day/month/year) 24/03/2000	Priority date (day/month/year) 26/03/1999	
International Patent Classification (IPC) or national classification and IPC D21J7/00			
Applicant SOUTHERN PULP MACHINERY (PTY) LIMITED et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 12 sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input checked="" type="checkbox"/> Certain defects in the international application VIII <input checked="" type="checkbox"/> Certain observations on the international application 			
Date of submission of the demand 23/10/2000		Date of completion of this report 06.07.2001	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Naeslund, P Telephone No. +49 89 2399 8614 	

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/ZA00/00057

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1,3-10,14	as originally filed			
2,2A,11,12,12A, 13	as received on	21/05/2001	with letter of	18/05/2001

Claims, No.:

6-9	as originally filed			
1-5,10-14	as received on	21/05/2001	with letter of	18/05/2001

Drawings, sheets:

1/7,2/7,4/7-7/7	as originally filed			
3/7	as received on	21/05/2001	with letter of	18/05/2001

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

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EXAMINATION REPORT**

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- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	3,5-9,11-14
	No:	Claims	1,2,4,10
Inventive step (IS)	Yes:	Claims	NONE
	No:	Claims	1-14
Industrial applicability (IA)	Yes:	Claims	1-14
	No:	Claims	NONE

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. From EP-A-0 728 868 (D1) (see col. 4, line 21-line 45; col. 5, line 28-line 33; figures) there is known a pulp moulding process for drying a wet preformed pulp including all essential features of at least claims 1,2,4 and 10 (Art. 33(2) PCT). The preformed pulp molding M is sucked (thus implicit a forming die present) by the receiving mold 1 (first die element) and is simultaneously pressed by the drying mold 10 (second die element - note hot air inlet 19). That the pressed, dried pulp products are transferred by the receiving mold downstream is considered as inherent in this type of processes. And also when this latter feature would be considered novel it is in any case not inventive as it is known from figures 1-3 of the present application which according to the applicant describe prior art in the field (Article 33 (3) PCT).

From US-A-4 088 259 (D2) (see col. 5, line 40-col. 7, line 20; figure 7) there is known an arrangement including the features: preparing pulp stock; a moulding in a die or mould (54); transferring in first die element (56) of a heated transferring die-and-heated pressing tool arrangement (56;58); transferring to the down line facility. This disclosure would therefore appear to anticipate at least claim 10 (Article 33(2) PCT). That in claim 1 the transfer to the down-line facility is performed by the second die element is only a matter of normal design procedure and therefore in any case not inventive (Art. 33(3) PCT).

Note I: claim 10 could be interpreted (see item VII-1 below) as if all features between "for use in" until "down-line facility" are not mandatory included in the scope of the claim. If such a view is taken then claim 10 does not amount to more than a tool arrangement of the type as clearly described in e.g. D1, Fig. 1 (see in particular ref. signs 10, 3, 19 and 7).

Note II: neither claim 1 nor claim 10 are restricted to a use in total of only three dies. Expressions such as "including" and "comprising" employed in claims 1 and 10 are not exclusive but inclusive.

2. With regard to the rest of the dependent claims, in the view of the cited prior art inclusively EP-A-0 731 214 (D3), EP-A-0 055 949 (D4), US-A-5 833 805 (D5) and WO-A-92 11414 (D6)(see international search report) they would not appear to be able to add any novel and inventive features to the independent claims on which they depend (Art. 33(3) PCT).
3. The industrial application would appear to be evident (Art. 33(4) PCT).

Re Item VII

Certain defects in the international application

1. Reference signs from the figures should be carefully included in the apparatus claims.
2. A document, or documents, reflecting the prior art ("in-mould drying" or "thermo-formed process") described on page 2, first paragraph is not identified in the description. It is requested that the applicants file the corresponding document(s) (Rule 5.1(a)(ii) PCT) on entry into the national/regional phase.
3. The two-part form should be (correctly) applied to each independent claim. It is not understood on which prior art the present preambles have been based as the features *"a first die element of a heated transferring die-and-heated pressing tool arrangement, comprising a first die element and a second die element, having a mould cavity therebetween,"* which features would appear essential are alternatively present either in the preamble (cf. claim 10) or the characterizing part (cf. claim 1). The format followed is usually: "A (name of the DEVICE and its FUNCTION) of the type having (recitation of the PRIOR ART, usually that found in a single REFERENCE) characterized in that (recitation of the improvement in the claim BODY)."
4. The documents D4-D6 cited should be acknowledged in the description. It should be clear which features of each of the independent claims are novel in view of each of the cited prior art.

Re Item VIII

Certain observations on the international application

1. It is not clear to which Category of claim, claim 10 pertains. The term "arrangement" normally implies an apparatus claim. Claim 10 however is to an essential part drafted in terms of process features (Art. 6 PCT). Whilst it is understood that it in certain cases could be necessary to recite process features in apparatus claims this would however not appear to be the present case. Claim 10 could be interpreted in such a way that all features included in "for use...down-line facility") are not a part of the tool arrangement, only an indication where it can be put into practice. It is thus not clear which apparatus features are mandatory included in the claim.
2. On page 12, second paragraph the heated transfer die (13)-and-heated pressing tool arrangement (14) is set out as being rotatable ("is rotatable") (emphasis added). This feature which would appear an essential feature is not present in the independent claims 1 and 10. It follows that it is questionable whether these claims describe the invention such that the problem underlying the present application is solved.
3. In view of what has been set out under point 2 it should be clear that the definition of the tool arrangement in claim 11 to be "A heated transfer die-and pressing tool arrangement" necessarily renders this claim unclear (Article 6 PCT).
4. The fact that the essential features *"a first die element of a heated transferring die-and-heated pressing tool arrangement, comprising a first die element and a second die element, having a mould cavity there between,"* figures in either the preamble or in the characterizing portion of the independent claims 10 and 1 renders these claims unclear (Article 6 PCT).
5. Claim 14 is directed to a "Press drying equipment as claimed in claim 10". Claim 10 however, on which claim 14 is dependent does not recite any "press drying equipment". In other words there is a lack of antecedent for the term "press drying equipment) (Article 6 PCT).

The male part (20) is further provided with a set of vents (23) so as to allow steam generated during the in-mould drying step to escape from the wet product (18) therethrough to the atmosphere. Alternatively, the steam generated may be scavenged under vacuum.

Alternatively designed in-mould drying equipment in accordance with the invention and as illustrated in figure 6 comprises a male part (24) and a female part (25), corresponding with the elements (13) and (14) respectively, each part being provided with a primary fluid passage (22) for receiving heating fluid therethrough so as to dry the in-mould wet product (18) therebetween.

In a second, and preferred, alternative design for in-mould drying equipment, as illustrated in figure 7, both the male part (24) and the female part (25) comprise a die element (28) and (29) respectively, mounted to a plate (30) including a plenum chamber (31) incorporating the primary fluid passage. The heated transfer die-and-pressing tool arrangement is configured so as to allow the in-mould pressing and drying step to take place with the plate (30) being orientated substantially vertically.

The male part (24) is further provided with a set of secondary fluid passages (27) and the female part (25) is further provided with a set of vents (26), the set of secondary fluid passages and the set of vents being staggered relative to each other so as to communicate

products in the respective dies (7), (13) and (14) and to eject the products from the dies and/or pressing moulds (14) when required.

5 The in-mould drying equipment in the form of the first die element (13) and the second die element (14) of the heated transfer die-and-heated pressing tool arrangement is rotatable so as to enable the transfer and press drying of the wet products from the forming die (7) to the conveyor (11) as dry products.

10 The first die element (13) and the second die element (14) are operatively associated mechanically with each other so as to provide a heated mechanical press therebetween, thus defining the heated transfer die-and-heated pressing tool arrangement therewith. Existing in-mould drying equipment as illustrated in figure 4 comprises a mould, having a male part (7) and a complementary female part (8), each part being heated electrically by
15 means of electric elements (19) so as to ensure the drying of an in-mould wet product (18). Male and female parts (7) and (8) are provided with air passages for scavenging steam generated during the drying process from the wet product (18) under vacuum.

Further in-mould drying equipment is disclosed in European Patent Application No. EPO 728 868 A2 in the name of Sintokogio Ltd. Comprising a pair of dies, each die being made up of a moulding member and a chamber forming member, forming between them a chamber, into which hot air is supplied. The moulding member includes a plurality of air-vent through-bores transmitting the hot air to the in-mould wet product.

In-mould drying equipment in accordance with the invention and as illustrated in figure 5 comprises a male part (20) and a female part (21), each part being provided with a fluid passage (22) for receiving a heated fluid therethrough for the drying of the in-mould wet product (18).

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pressing tools (9) with means for scavenging steam resulting from heating under vacuum from the wet product. Once the product has been dried to the required degree, the dried product is ejected onto a conveyor (11) for transfer to down line facilities.

5

The process typically includes a facility (12) for cooling the steam scavenged under vacuum from the wet products (9).

10

An in-mould drying, pulp moulding process in accordance with the invention and partially as illustrated in figure 3 includes the steps of preparing pulp stock in a pulper (not shown); forming wet products by means of forming dies (7) in a moulder (6); transferring the wet products from the forming dies by means of a heated transferring die-and-heated pressing tool arrangement generally indicated by the number 35, comprising a first die element (13) and a second die element (14), having a mould cavity therebetween, for in-mould pressing and drying of the wet products; and delivering the dried products to a conveyor belt (11) for conveyance to a storage facility (18) where the dried products are stacked by means of an automatic stacker (15).

20

As in the traditional type moulding process (figure 1) and the existing in-mould drying, pulp moulding process (figure 2), the in-mould drying, pulp moulding process in accordance with the invention utilizes negative and positive air pressures to retain the

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A known improvement of the traditional pulp moulding process is the so-called "in-mould drying" or "thermo-formed" process, the process endeavouring to achieve an improved quality comparable with injection moulded, thermoformed plastic products.

5 The in-mould drying process comprises the traditional process, characterized in that it substitutes the step of conveyor drying with an in-mould drying step wherein the wet or so-called "in-mould" dried product is press dried between heated, opposed, closable pressing tools, with steam resulting from the heating being scavenged under vacuum. The incorporation of the in-mould drying step is aimed at improving poor product finish such
10 as surface coarseness as well as dimensional inaccuracies and deformities. The poor product finish is caused primarily during the drying process, where the wet product is subjected to high temperature, high velocity air flow. In a preferred form, the in-mould drying process includes further in-mould drying in down line pressing stations. The added advantage of additional pressing stations is the speeding up of the pressing portion of the
15 pressing and drying process.

A variation of such in-mould drying processes is found in U S Patent no. 4,088,259 in the name of John T Sutton. U S Patent No. 4,088,259 discloses apparatus for moulding an egg carton wherein a pulp egg carton is formed in a forming mould, transferred to a
20 vacuum drying mould, and carried through several subsequent drying and finish-forming stations.

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